

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                         |  |                                                                                                  |  |                                            |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|--------------------------------------------------------------------------------------------------|--|--------------------------------------------|--|
| <b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                         |  | 1. CONTRACT ID CODE<br><b>J</b>                                                                  |  | PAGE OF PAGES<br><b>1   2</b>              |  |
| 2. AMENDMENT/MODIFICATION NO.<br><b>0011</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | 3. EFFECTIVE DATE<br><b>03-Dec-2003</b> |  | 4. REQUISITION/PURCHASE REQ. NO.<br><b>W68MD9-2183-1410</b>                                      |  | 5. PROJECT NO.(If applicable)              |  |
| 6. ISSUED BY<br>USA ENGINEER DISTRICT, SEATTLE<br>ATTN: CENWS-CT<br>4735 EAST MARGINAL WAY SOUTH<br>SEATTLE WA 98134-2329                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | CODE<br><b>W912DW</b>                   |  | 7. ADMINISTERED BY (If other than item 6)<br><br><b>See Item 6</b>                               |  | CODE                                       |  |
| 8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                         |  | <input checked="" type="checkbox"/> 9A. AMENDMENT OF SOLICITATION NO.<br><b>DACW67-03-R-0001</b> |  |                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                         |  | <input checked="" type="checkbox"/> 9B. DATED (SEE ITEM 11)<br><b>19-Sep-2003</b>                |  |                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                         |  | 10A. MOD. OF CONTRACT/ORDER NO.                                                                  |  |                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                         |  | 10B. DATED (SEE ITEM 13)                                                                         |  |                                            |  |
| CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | FACILITY CODE                           |  |                                                                                                  |  |                                            |  |
| <b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                         |  |                                                                                                  |  |                                            |  |
| <input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended.<br>Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:<br>(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted;<br>or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. <b>FAILURE OF YOUR ACKNOWLEDGMENT TO BE<br/>         RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN<br/>         REJECTION OF YOUR OFFER.</b> If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter,<br>provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified. |  |                                         |  |                                                                                                  |  |                                            |  |
| 12. ACCOUNTING AND APPROPRIATION DATA (If required)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                         |  |                                                                                                  |  |                                            |  |
| <b>13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.<br/>IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                         |  |                                                                                                  |  |                                            |  |
| A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                         |  |                                                                                                  |  |                                            |  |
| B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                         |  |                                                                                                  |  |                                            |  |
| C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                         |  |                                                                                                  |  |                                            |  |
| D. OTHER (Specify type of modification and authority)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                         |  |                                                                                                  |  |                                            |  |
| E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                         |  |                                                                                                  |  |                                            |  |
| 14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)<br><b>DACW67-03-R-0001 FISH PASSAGE COFFERDAM AND EXCAVATION, HOWARD HANSON DAM, KING COUNTY, WASHINGTON</b><br><br>The purpose of this amendment (R0011) is to incorporate the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                         |  |                                                                                                  |  |                                            |  |
| Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                         |  |                                                                                                  |  |                                            |  |
| 15A. NAME AND TITLE OF SIGNER (Type or print)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                         |  | 16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)                                       |  |                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                         |  | TEL: _____ EMAIL: _____                                                                          |  |                                            |  |
| 15B. CONTRACTOR/OFFEROR<br><br>_____<br>(Signature of person authorized to sign)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | 15C. DATE SIGNED                        |  | 16B. UNITED STATES OF AMERICA<br><br>BY _____<br>(Signature of Contracting Officer)              |  | 16C. DATE SIGNED<br><br><b>03-Dec-2003</b> |  |


## SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**AMENDMENT ELEVEN**

- A. This amendment provides for the following changes:
- (1) Revision to Section 00800 Special Clauses
  - (2) Revision to Section 02251 Foundation Drilling and Grouting
  - (3) Revision to SF 1442, date.
- B. The attached revised pages supersede and replace the corresponding pages. The attached revised specification sections supersede and replace the corresponding specification sections. Specification changes are generally identified for convenience, by strikeout for deletions and underlining of text for additions. All portions of revised or new pages shall apply whether or not changes have been indicated.
- C. The proposal submittal time and date is extended to December 9, 2003 at 2:00 p.m. LOCAL TIME.
- D. NOTICE TO OFFERORS: Offerors must acknowledge receipt of this amendment by number and date on the offer or by telegram. Please mark outside of envelope in which your offer is enclosed to show amendments received.

Encl.

Section 00800 (revised)  
Section 02251 (revised)  
SF 1442 (revised)

|                                                                                                                       |                                                                                               |                                                                                                                                                                                                                                                                             |                                     |                        |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------|
| <b>SOLICITATION, OFFER,<br/>AND AWARD</b><br><i>(Construction, Alteration, or Repair)</i>                             | 1. SOLICITATION NUMBER<br><br>DACW67-03-R-0001                                                | 2. TYPE OF SOLICITATION<br><br><input type="checkbox"/> SEALED BID (IFB)<br><input checked="" type="checkbox"/> NEGOTIATED (RFP)                                                                                                                                            | 3. DATE ISSUED<br><br>Sept 19, 2003 | PAGE OF PAGES<br><br>1 |
|                                                                                                                       | <b>IMPORTANT - The "offer" section on the reverse must be fully completed by the offeror.</b> |                                                                                                                                                                                                                                                                             |                                     |                        |
| 4. CONTRACT NUMBER                                                                                                    | 5. REQUISITION/PURCHASE REQUEST NUMBER<br>W68MD9-2183-1410                                    | 6. PROJECT NUMBER                                                                                                                                                                                                                                                           |                                     |                        |
| 7. ISSUED BY<br>Seattle District, Corps of Engineers<br>ATTN: CENWS-CT-CB-CU<br>PO Box 3755<br>Seattle, WA 98124-3755 | CODE<br>W68MD9                                                                                | 8. ADDRESS OFFER TO<br>Seattle District, Corps of Engineers<br>PO Box 3755 ATTN: CENWS-CT-CB-CU<br>Seattle, WA 98124-3755<br><br>HAND CARRY: Preston Conference Room<br>4735 East Marginal Way South<br>Seattle, WA 98134-2385<br>BID OPENING ROOM: Preston Conference Room |                                     |                        |
| 9. FOR INFORMATION CALL              | A. NAME<br>See Information Page inside Front Cover                                            | B. TELEPHONE NUMBER (Include area code) (NO COLLECT CALLS)<br>See Information Page inside Front Cover                                                                                                                                                                       |                                     |                        |

**SOLICITATION**

**NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".**

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying number, date):

Furnish all labor, materials and equipment and perform all work for Fish Passage Facility Cofferdam and Excavation, Howard Hanson Dam, King County, Washington in accordance with the attached Contract Clauses, Special Clauses, Technical Specifications and Drawings.

NOTE: Award will be made pursuant to the Small Business Competitive Demonstration Program.

|                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 11. The Contractor shall begin performance within <u>10</u> calendar days and complete it within _____ calendar days after receiving<br><input type="checkbox"/> award, <input checked="" type="checkbox"/> notice to proceed. This performance period is <input checked="" type="checkbox"/> mandatory, <input type="checkbox"/> negotiable. (See * Paragraph SC-1, 00800 .)                                                         |                              |
| 12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE PAYMENT BONDS?<br>(If "YES," indicate within how many calendar days after award in Item 12B.)<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO                                                                                                                                                                                                        | 12B. CALENDAR DAYS<br><br>10 |
| 13. ADDITIONAL SOLICITATION REQUIREMENTS:                                                                                                                                                                                                                                                                                                                                                                                             |                              |
| A. Sealed offers in original and _____ copies to perform the work required are due at the place specified in Item 8 by <u>2:00 p.m.</u> (hour) local time <u>December 9, 2003</u> (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelope containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due. |                              |
| B. An offer guarantee <input checked="" type="checkbox"/> is, <input type="checkbox"/> is not required.                                                                                                                                                                                                                                                                                                                               |                              |
| C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.                                                                                                                                                                                                                                                                           |                              |
| D. Offers providing less than <u>90</u> calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.                                                                                                                                                                                                                                                                            |                              |

**OFFER (Must be fully completed by offeror)**

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)

15. TELEPHONE NUMBER (Include area code)

FAX:

16. REMITTANCE ADDRESS (Include only if different than Item 14)

Tax ID No: \_\_\_\_\_ DUNS No: \_\_\_\_\_  
eMail: \_\_\_\_\_

CODE

FACILITY CODE

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within \_\_\_\_\_ calendar days after the date offers are due. (Insert any number equal or greater than the minimum requirement stated in 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)

AMOUNTS



See page 00010-5 thru 00010-10

18. The offeror agrees to furnish any required performance and payment bonds.

**19. ACKNOWLEDGEMENT OF AMENDMENTS**

(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.

DATE

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)

20B. SIGNATURE

20C. OFFER DATE

**AWARD (To be completed by Government)**

21. ITEMS ACCEPTED

22. AMOUNT

23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN  
(4 copies unless otherwise specified)

ITEM

26

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO

☐ 10 U.S.C. 2304(c) ( )☐ 41 U.S.C. 253(c) ( )

26. ADMINISTERED BY

CODE

27. PAYMENT WILL BE MADE BY

United States Army Corps of Engineers Seattle District  
Northwest Area Office  
PO Box 92146  
Tillicum, WA 98492-0146US Army Corps of Engineers Finance Center  
CEFC-AO-P  
5722 Integrity Drive  
Millington, TN 38054-5005**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

☐ 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return \_\_\_\_\_ copies to the issuing office.) Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.

☐ 29. AWARD. (Contractor is not required to sign this document.) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN  
(Type or print)

31A. NAME OF CONTRACTING OFFICER (Type or print)

CONTRACTING OFFICER

30B. SIGNATURE

30C. DATE

31B. UNITED STATES OF AMERICA

31C. AWARD DATE

BY

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SPECIAL CLAUSES

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|---------------|-------------------------------------------------------------------------|
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| SC-2          | LIQUIDATED DAMAGES - CONSTRUCTION                                       |
| SC-3          | <u>DELETED</u> – TIME EXTENSIONS                                        |
| SC-4          | VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS                   |
| SC-5          | INSURANCE - WORK ON A GOVERNMENT INSTALLATION                           |
| SC-6          | CONTINUING CONTRACTS                                                    |
| SC-7          | PERFORMANCE OF WORK BY THE CONTRACTOR                                   |
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| SC-13         | <u>DELETED</u> – IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY        |
| SC-14         | EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE                      |
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| SC-19.        | <u>DELETED</u> – TECHNICAL PROPOSAL - COPIES TO BE FURNISHED UPON AWARD |
| SC-20.        | <u>DELETED</u> – COMPLIANCE CERTIFICATION                               |
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| SC-22.        | EPA ENERGY STAR                                                         |
| SC-23         | RECOVERED MATERIALS                                                     |

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## SPECIAL CLAUSES

SC-1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) (FAR 52.211-10).

The Contractor shall be required to (a) commence work under this Contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 685 calendar days after date of receipt by Contractor of notice to proceed. The time stated for completion shall include final cleanup of the premises.

SC-2. LIQUIDATED DAMAGES - CONSTRUCTION (SEP 2000) (FAR 52.211-12)

(a) If the Contractor fails to complete the work within the time specified in the Contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$2,415.00 for each day of delay.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

SC-3 DELETED.

SC-4. VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS (MAR 1995) (EFARS 52.212-5001): This variation in estimated quantities clause is applicable only to Item Nos. 0003, 0010, 0011, 0012, 0013, 0014, 0015, 0016, 0017, 0018, 0019, 0020, 0021, 0022, 0023, 0024, 0025, 0026, 0027, 0028, 0029, 0030, 0031, 0032, 0033, ~~and~~ 0034, 0040, 0041, 0042, 0043, 0044 and 0045.

(a) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.

(b) Where the actual quantity of work performed for Items Nos. 0003, 0010, 0011, 0012, 0013, ~~and~~ 0014, 0015, 0016, 0017, 0018, 0019, 0020, 0021, 0022, 0023, 0024, 0025, 0026, 0027, 0028, 0029, 0030, 0031, 0032, 0033, 0034, 0040, 0041, 0042, 0043, 0044 and 0045 is less than 85 % of the quantity of the first sub-item listed under such item, the Contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(c) If the actual quantity of work performed under Items Nos. 0003, 0010, 0011, 0012, 0013, ~~and~~ 0014, 0015, 0016, 0017, 0018, 0019, 0020, 0021, 0022, 0023, 0024, 0025, 0026, 0027, 0028, 0029, 0030, 0031, 0032, 0033, 0034, 0040, 0041, 0042, 0043, 0044 and 0045 exceeds 115 percent or is less than 85 percent of the total estimated quantity of the sub-item under that item and/or if the quantity of the work performed under the second sub-item or any subsequent sub-item under Items Nos. 0003, 0010, 0011, 0012, 0013, ~~and~~ 0014, 0015, 0016, 0017, 0018, 0019, 0020, 0021, 0022, 0023, 0024, 0025, 0026, 0027, 0028, 0029, 0030, 0031, 0032, 0033, 0034, 0040, 0041, 0042, 0043, 0044 and 0045 exceeds 115 % or is less than 85 % of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in

the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

SC-5. INSURANCE - WORK ON A GOVERNMENT INSTALLATION (JAN 1997) (FAR 52.228-5)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance period of this Contract at least the kinds and minimum amounts of insurance required in the Insurance Liability Schedule or elsewhere in the Contract.

(b) Before commencing work under this Contract, the Contractor shall certify to the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective:

(1) for such period as the laws of the State in which this Contract is to be performed prescribe;  
or

(2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this Contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the Contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(d) Insurance Liability Schedule (FAR 28.307-2)

(1) Workers' compensation and employer's liability. Contractors are required to comply with applicable Federal and State workers' compensation and occupational disease statutes. If occupational diseases are not compensable under those statutes, they shall be covered under the employer's liability section of the insurance policy, except when Contract operations are so commingled with a Contractor's commercial operation that it would not be practical to require this coverage. Employer's liability coverage of at least \$100,000 shall be required, except in states with exclusive or monopolistic funds that do not permit workers' compensation to be written by private carriers.

(2) General Liability.

(a) The Contracting Officer shall require bodily injury liability insurance coverage written on the comprehensive form of policy of at least \$500,000 per occurrence.

(b) Property damage liability insurance shall be required only in special circumstances as determined by the agency.

(3) Automobile liability. The Contracting Officer shall require automobile liability insurance written on the comprehensive form of policy. The policy shall provide for bodily injury and property damage liability covering the operation of all automobiles used in connection with performing the Contract. Policies covering automobiles operated in the United States shall provide coverage of at least \$200,000 per person and \$500,000 per occurrence for bodily injury and \$20,000 per occurrence for property



damage. The amount of liability coverage on other policies shall be commensurate with any legal requirements of the locality and sufficient to meet normal and customary claims.

(4) Aircraft public and passenger liability. When aircraft are used in connection with performing the Contract, the Contracting Officer shall require aircraft public and passenger liability insurance. Coverage shall be at least \$200,000 per person and \$500,000 per occurrence for bodily injury, other than passenger liability, and \$200,000 per occurrence for property damage. Coverage for passenger liability bodily injury shall be at least \$200,000 multiplied by the number of seats or passengers, whichever is greater.

(5) Environmental Liability. If this contract includes the transport, treatment, storage, or disposal of hazardous material waste the following coverage is required.

The Contractor shall ensure the transporter and disposal facility have liability insurance in effect for claims arising out of the death or bodily injury and property damage from hazardous material/waste transport, treatment, storage and disposal, including vehicle liability and legal defense costs in the amount of \$1,000,000.00 as evidenced by a certificate of insurance for General, Automobile, and Environmental Liability Coverage. Proof of this insurance shall be provided to the Contracting Officer.

#### SC-6. CONTINUING CONTRACTS (EFARS 52.232-5001) (MAR 1995):

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922 (33 U.S. Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.

(b) The sum of \$7,000,000.00 has been reserved for this contract and is available for payments to the Contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds together with funds provided by one or more non-federal project sponsors will be reserved for this contract.

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not entitle the Contractor to a price adjustment under the terms of this contract, except as specifically provided in paragraphs (f) and (i) below. No such failure shall constitute a breach of this contract, except that this provision shall not bar a breach-of-contract action if an amount finally determined to be due as a termination allowance remains unpaid for one year due solely to a failure to reserve sufficient additional funds therefore.

(d) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The Contracting Officer will promptly notify the Contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(e) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the Contracting Officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due, or to become due, under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. The Contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.

(g) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under the "Suspension of Work" clause or in any other manner under this contract.

(h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(i) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the Contracting Officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be considered a termination for the convenience of the Government.

(j) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

SC-7. PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) (FAR 52.236-1): The Contractor shall perform on the site, and with its own organization, work equivalent to at least fifteen percent (15%) of the total amount of work to be performed under the Contract. The percentage may be reduced by a supplemental agreement to this Contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

SC-8. PHYSICAL DATA (APR 1984) (FAR 52.236-4): Data and information furnished or referred to below is for the Contractor's information. The Government will not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) Physical Conditions: The indications of physical conditions on the drawings and in the specifications are the result of site investigations by test holes shown on the drawings.

(b) Weather Conditions: Each bidder shall be satisfied before submitting his bid as to the hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from any National Weather Service Office.

(c) Transportation Facilities: Each bidder, before submitting his bid, shall make an investigation of the conditions of existing public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the jobsite. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of the work.

(d) Right-of-Way: The right-of-way for the work covered by these specifications will be furnished by the Government, except that the Contractor shall provide right-of-way for ingress and egress across private property where necessary to gain access to the jobsite. The Contractor may use such portions of the land within the right-of-way not otherwise occupied as may be designated by the Contracting Officer. The Contractor shall, without expense to the Government, and at any time during the progress of the work when space is needed within the right-of-way for any other purposes, promptly vacate and clean up any part of the grounds that have been allotted to, or have been in use by, him when directed to do so by the Contracting Officer. The Contractor shall keep the buildings and grounds in use by him at the site of the work in an orderly and sanitary condition. Should the Contractor require additional working space or lands for material yards, job offices, or other purposes, he shall obtain such additional lands or easements at his expense.

(e) Condition of Area: The condition of the area when last surveyed is shown on the drawings. Topography is in feet and represents elevation with reference to National Geodetic Vertical Datum (N.G.V.D.).

(f) Datum and Bench Marks: The plane of reference of N.G.V.D. as used in these specifications is that determined by the bench marks, as shown on the drawings.

(g) Howard Hanson Dam and Reservoir Hydraulics and Hydrology: More information on conditions at the reservoir that will directly effect construction and the scheduling of construction is available attached to the end of Section 01005.

(h) Geotechnical Baseline Report. This report is attached to the end of this section. It provides available information on the Geotechnical properties of the site.

SC-9. DELETED.

SC-10. LAYOUT OF WORK (APR 1984) (FAR 52.236-17): The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due, or to become due, to the Contractor.

SC-11. PAYMENT FOR MOBILIZATION AND DEMOBILIZATION. Payment No. 0002 (DEC 1991) (FAR 52.236-7004):

(a) The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) Fifty percent (50%) of the lump sum price upon completion of the Contractor's mobilization at the work site.

(2) The remaining fifty percent (50%) upon completion of the demobilization.

(b) The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs (a)(1) and (2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of --

- (i) Actual mobilization costs at completion of mobilization;
- (ii) Actual demobilization costs at completion of demobilization; and
- (iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph (b)(1) of this clause is not subject to appeal.

(c) This item is not to be confused with Emergency De-mobilization and Re-mobilization due to floods. See Specifications Section 01050 for more information.

SC-12 AND SC-13 DELETED.

SC-14. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAY 1999)-  
(EFARS 52.231-5000)

(a) This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region VIII. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost

or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(e) Copies of EP1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" Volumes 1 through 12 are available in Portable Document Format (PDF) and can be viewed or downloaded at <http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/cecw.htm>. A CD-ROM containing (Volumes 1-12) is available through either the Superintendent of Documents or Government bookstores. For additional information telephone 202-512-2250, or access on the Internet at [http://www.access.gpo.gov/su\\_docs](http://www.access.gpo.gov/su_docs).

SC-15. PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAY 1999)-(EFARS 52.232-5000)

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to:

(1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item.

SC-16 AND SC-17 DELETED.

SC-18. CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (OCT 1996) (52.0236-4001 EBS)

(a) The Government--

(1) Will provide the Contractor, without charge, one set of contract drawings and one set of specifications in electronic format on a compact disk. The Government will not give the Contractor any hard copy paper drawings or specifications for any contract resulting from this solicitation.

(b) The Contractor shall--

(1) check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies; and

(4) Be responsible for any errors which might have been avoided by complying with this paragraph (b).

(c) Large scale drawings shall, in general, govern small scale drawings. Figures marked on drawings shall, in general, be followed in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work, but shall be performed as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified in the index of drawings attached at the end of the Special Clauses.

SC-19 THROUGH SC-21 DELETED.

SC-22. EPA ENERGY STAR: The Government requires that certain equipment be Energy Star compliant. Initially, the sole Energy Star requirement shall be the self certification by the bidder that the specified equipment is Energy Star compliant. Within 3 months of the availability of an EPA sanctioned test for Energy Star compliance, the Contractor shall submit all equipment upgrades and additions for testing and provide proof of compliance to the Government upon completion of testing. Testing shall be at the Contractor's expense.

SC-23. RECOVERED MATERIALS: The Corps of Engineers encourages all bidders to utilize recovered materials to the maximum extent practicable. The attached APPENDIX R contains procurement guidelines for products containing recovered materials.

## APPENDIX R

### PART 247 - COMPREHENSIVE PROCUREMENT GUIDELINE FOR PRODUCTS CONTAINING RECOVERED MATERIALS

40 CFR Ch. 1 (9-1-99 Edition)

#### Subpart B-Item Designations

##### § 247.10 Paper and paper products.

Paper and paper products, excluding building and construction paper grades.

##### § 247.11 Vehicular products.

(a) Lubricating oils containing re-refined oil, including engine lubricating oils, hydraulic fluids, and gear oils, excluding marine and aviation oils.

(b) Tires, excluding airplane tire

(e) Reclaimed engine coolants, excluding coolants used in non-vehicular applications.

##### 247.12 Construction products.

(a) Building insulation product including the following items:

(1) Loose-fill insulation, including but not limited to cellulose fiber, mineral fibers (fiberglass and rock vermiculite, and perlite;

(2) Blanket and batt insulation, including but not limited to mineral fibers (fiberglass and rock wool).

(3) Board (sheathing, roof decking wall panel) insulation, including but not limited to structural fiberboard and laminated paperboard products perlite composite board, polyurethane, polyisocyanurate, polystyrene, phenolics, and composites; and

(4) Spray-in-place insulation, including but not limited to foam-in-place polyurethane and polyisocyanurate and spray-on cellulose.

(b) Structural fiberboard and laminated paperboard products for applications other than building insulation, including building board, sheathing shingle backer, sound deadening board, roof insulating board, insulating wallboard, acoustical and non-acoustical ceiling tile, acoustical and non-acoustical lay-in panels, floor underlayments, and roof overlay (cover board).

(c) Cement and concrete, including concrete products such as pipe and block, containing coal fly as ground granulated blast furnace (GGBF) slag.

(d) Carpet made of polyester fiber use in low- and medium-wear applications.

(e) Floor tiles and patio block containing recovered rubber or plastic.

(f) Shower and restroom dividers/partitions containing recovered plastic or steel.

(g) (1) Consolidated latex paint used for covering graffiti; and

(2) Reprocessed latex paint used for interior and exterior architectural applications such as wallboard, ceilings, and trim; gutter boards; and concrete, stucco, masonry, wood and metal surfaces.

##### §247.13 Transportation products.

(a) Traffic barricades and traffic cones used in controlling or restricting vehicular traffic.

(b) Parking stops made from concrete or containing recovered plastic or rubber.

(c) Channelizers containing recovered plastic or rubber.

(d) Delineators containing recovered plastic, rubber, or steel.

- (e) Flexible delineators containing recovered plastic.

§ 247.14 Park and recreation products

- (a) Playground surfaces and running tracks containing recovered rubber or plastic.
- (b) Plastic fencing containing recovered plastic for use in controlling snow or sand drifting and as a warning/safety barrier in construction or other applications.

247.15 Landscaping products.

- (a) Hydraulic mulch products containing recovered paper or recovered wood used for hydroseeding and as an over-spray for straw mulch in landscaping, erosion control, and soil reclamation.
- (b) Compost made from yard trimmings, leaves, and/or grass clippings for use in landscaping, seeding of grass or other plants on roadsides and embankments, as a nutritious mulch under trees and shrubs, and in erosion control and soil reclamation.
- (c) Garden and soaker hoses containing recovered plastic or rubber.
- (d) Lawn and garden edging containing recovered plastic or rubber.

§ 247.16 Non-paper office product.

- (a) Office recycling containers and office waste receptacles.
- (b) Plastic desktop accessories.
- (c) Toner cartridges.
- (d) Binders.
- (e) Plastic trash bags.
- (f) Printer ribbons.
- (g) Plastic envelopes.

§ 247.17 Miscellaneous products.

Pallets containing recovered wood, plastic, or paperboard.



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COFFERDAM AND EXCAVATION  
HOWARD HANSON DAM, GREEN RIVER, WASHINGTON

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| 113             | S2.11           | Precast Concrete Structure Segments F & G                | A                  | 13 OCT 03 |

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| 116             | S2.14           | Precast Concr. Structure Segments L, M, N, & P, Sheet 1          |                    | 27 JUN 03 |
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| 118             | S2.16           | Precast Concrete Structure Backflood Pipe                        |                    | 27 JUN 03 |
| 119             | S2.17           | Precast Concrete Structure Segment Anchor Details                |                    | 27 JUN 03 |
| 120             | S2.18           | Typical Stoplog Bearing & Seal Surface And Segment Joint Details | A                  | 13 OCT 03 |
| 121             | S2.19           | Precast Concrete Segment Support Frame Sheet 1                   |                    | 27 JUN 03 |
| 122             | S2.20           | Precast Concrete Segment Support Frame Sheet 2                   | A                  | 13 OCT 03 |
| 123             | S3.1            | Cast-In-Place Concrete South Wall Detail Sheet 1                 | A                  | 13 OCT 03 |
| 124             | S3.2            | Cast-In-Place Concrete South Wall Detail Sheet 2                 | A                  | 13 OCT 03 |
| 125             | S3.3            | Cast-In-Place Concrete North Wall Detail Sheet 1                 |                    | 27 JUN 03 |
| 126             | S3.4            | Cast-In-Place Concrete North Wall Detail Sheet 2                 | A                  | 13 OCT 03 |
| 127             | S3.5            | Cast-In-Place Concrete North Wall Detail Sheet 3                 |                    | 27 JUN 03 |
| 128             | S3.6            | Cast-In-Place Concrete Crane Rail Support Beams Sht. 1           | A                  | 13 OCT 03 |
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| 130             | S3.8            | South Wall Rock Anchors                                          | A                  | 13 OCT 03 |
| 131             | S3.9            | South Wall Rock Anchor Details                                   | B                  | 20 NOV 03 |
| 132             | S3.10           | South Counterfort Walls Elevations And Sections                  |                    | 27 JUN 03 |
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| 134             | S4.1            | Trash Rack Detail Sheet 1                                        |                    | 27 JUN 03 |
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| 140                     | S5.4                    | Stoplog Details Sheet 4                                        | B                          | 20 NOV 03   |
| 141                     | S5.5                    | Lifting Beam Plan & Elevation                                  | A                          | 13 OCT 03   |
| 142                     | S5.6                    | Lifting Beam Detail Sheet 1                                    | A                          | 13 OCT 03   |
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| 148                     | S7.1                    | Access Road Permanent Retaining Wall, Plan<br>And Elevation    |                            | 27 JUN 03   |
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| 150                     | S8.1                    | Existing Intake Tower Seismic Retrofit<br>Trashrack Beams      | B                          | 20 NOV 03   |
| 151                     | S8.2                    | Existing Intake Tower Seismic Retrofit<br>Wingwalls            | B                          | 20 NOV 03   |
| 152                     | S8.3                    | Existing Intake Tower Seismic Retrofit Plan<br>& Elevation     | A                          | 13 OCT 03   |
| 153                     | S8.4                    | Existing Intake Tower Seismic Retrofit<br>Section And Detail 1 |                            | 27 JUN 03   |
| 154                     | S8.5                    | Existing Intake Tower Seismic Retrofit<br>Section And Detail 2 |                            | 27 JUN 03   |
| 155                     | S8.6                    | Existing Intake Tower Seismic Retrofit<br>Tremie Concrete      | A                          | 13 OCT 03   |

REFERENCE DRAWINGS

Reference drawings provided show conditions at time of construction. These drawings are furnished for information only and the Government does not warrant that conditions will be exactly as shown. Minor deviations can be anticipated and shall not be the basis for a claim for extra compensation.

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|                   | 156             | 25              | Spillway General Layout                                    |                    | 23 AUG 59 |
|                   | 157             | 27              | Spillway Intermediate Pier Plan,<br>Elevations & Sections  |                    | 12 SEP 58 |
|                   | 158             | 28              | Spillway Intermediate Pier<br>Reinforcement                |                    | 12 SEP 58 |
|                   | 159             | 29              | Spillway Left Abutment Pier Plan,<br>Elevations & Sections |                    | 12 SEP 58 |
|                   | 160             | 33              | Spillway Right Abutment                                    |                    | 10 OCT 60 |
|                   | 161             | 42              | Spillway Crest Gate Elevations &<br>Sections               |                    | 12 SEP 58 |
|                   | 162             | 43              | Spillway Crest Gate Details                                |                    | 12 SEP 58 |
|                   | 163             | 44              | Spillway Crest Gate Details                                |                    | 12 SEP 58 |
|                   | 164             | 48              | General Layout                                             |                    | 12 SEP 58 |
|                   | 165             | 49              | Substructure Sectional Plans I                             |                    | 12 SEP 58 |
|                   | 166             | 50              | Substructure Sectional Plans II                            | B                  | 21 APR 65 |
|                   | 167             | 51              | Substructure Sectional Elevations I                        | B                  | 22 SEP 59 |
|                   | 168             | 52              | Substructure Sectional Elevations<br>II                    | B                  | 22 SEP 59 |
|                   | 169             | 53              | Substructure Elevations                                    | C                  | 22 SEP 59 |
|                   | 170             | 54              | Substructure Plans & Sections                              | B                  | 28 AUG 59 |
|                   | 171             | 55              | Reinforcement I                                            | B                  | 27 OCT 58 |
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|                   | 174             | 57              | Reinforcement III                        | B                  | 21 APR 65 |
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|                   | 176             | 59              | Trash Rack Bars                          |                    | 12 SEP 58 |
|                   | 177             | 65              | Equipment General Arrangement I          |                    | 12 SEP 58 |
|                   | 178             | 66              | Equipment General Arrangement II         | A                  | 21 APR 65 |
|                   | 179             | 67              | Regulating Gate Plans & Sections         | A                  | 21 APR 65 |
|                   | 180             | 68              | Regulating Gate Elevations & Sections    | A                  | 21 APR 65 |
|                   | 181             | 69              | Regulating Gate Details                  |                    | 12 SEP 58 |
|                   | 182             | 70              | Regulating Gate Details                  | A                  | 21 APR 65 |
|                   | 183             | 71              | Regulating Gate Seals                    | A                  | 21 APR 65 |
|                   | 184             | 72              | Regulating Gate Hoist Assembly           | A                  | 21 APR 65 |
|                   | 185             | 87              | Tunnel Upstream Transition               |                    | 12 SEP 58 |
|                   | 186             | 88A             | Tunnel Sections & Details                | A                  | 27 OCT 58 |
|                   | 187             | 88B             | Tunnel Downstream Transition             | A                  | 27 OCT 58 |
|                   | 188             | 89              | Stilling Basin Plan & Section I          | B                  | 10 APR 61 |
|                   | 189             | 90              | Stilling Basin Plan & Section II         | C                  | 21 APR 65 |
|                   | 190             | 91              | Stilling Basin Sections                  | C                  | 10 APR 61 |
|                   | 191             | 92              | Stilling Basin Details                   | B                  | 2 FEB 60  |
|                   | 192             | 93              | Stilling Basin Bypass Outlet Gate        | A                  | 10 APR 61 |
|                   | 193             | 94              | Bridge Plan, Elevation & Sections        | D                  | 10 APR 61 |
|                   | 194             | 95              | Bridge Detail Plan, Elevation & Sections | B                  | 10 OCT 60 |
|                   | 195             | 96              | Bridge Details                           | A                  | 3 OCT 58  |
|                   | 196             | 97              | Bridge Piers                             | A                  | 3 OCT 58  |



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|                   | 197             | G-1             | Seismic Upgrade – Cover Sheet                                          |                    | 1 NOV 96  |
|                   | 198             | G-2             | Seismic Upgrade – Index                                                |                    | 1 NOV 96  |
|                   | 199             | G-3             | Seismic Upgrade – Site Map                                             |                    | 1 NOV 96  |
|                   | 200             | G-4             | Existing Surface Topography                                            |                    | 1 NOV 96  |
|                   | 201             | S-1             | Structural Notes And Rock Anchor<br>Detail                             |                    | 1 NOV 96  |
|                   | 202             | S-2             | Modifications To The Existing<br>Bridge And Tower                      |                    | 20 NOV 95 |
|                   | 203             | S-3             | Foundation                                                             |                    | 1 NOV 96  |
|                   | 204             | S-4             | Elevation & Section                                                    |                    | 1 NOV 96  |
|                   | 205             | S-5             | Details I                                                              |                    | 1 NOV 96  |
|                   | 206             | S-6             | Details II                                                             |                    | 1 NOV 96  |
|                   | 207             | S-7             | Footing Caps                                                           |                    | 1 NOV 96  |
|                   | 208             | S-8             | Shear Panels for Pier I                                                |                    | 1 NOV 96  |
|                   | 209             | S-9             | Shear Panels For Piers 2 And 3                                         |                    | 1 NOV 96  |
|                   | 210             | S-10            | Shear Panel Sections                                                   |                    | 1 NOV 96  |
|                   | 211             | S-11            | Deck Restraint Cable Details                                           |                    | 1 NOV 96  |
|                   | 212             | S-12            | Deck Lateral Restraint                                                 |                    | 1 NOV 96  |
|                   | 213             | M-1             | Hoist Carriage Restraint                                               |                    | 1 NOV 96  |
|                   | 214             | GT-1A           | Instrumentation On Existing<br>Structures, Site Plan                   |                    | 3 JUL 03  |
|                   | 215             | GT-1B           | Instrumentation On Existing<br>Structures, Outlet Tunnel Plan          |                    | 3 JUL 03  |
|                   | 216             | GT-2            | Instrumentation On Existing<br>Structures, Instrumentation<br>Schedule |                    | 3 JUL 03  |
|                   | 217             | GT-3            | Instrumentation On Existing                                            |                    | 3 JUL 03  |

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|                   |                 |                 | Structures, Structure Elevation                                                          |                    |           |
|                   | 218             | Gt-4            | Instrumentation On Existing<br>Structures, Liquid Level Gages                            |                    | 3 JUL 03  |
|                   | 219             | GT-5            | Instrumentation On Existing<br>Structures, Intake Tower<br>Instruments, Seismic Retrofit |                    | 3 JUL 03  |
|                   | 220             | GT-6            | Instrumentation On Existing<br>Structures, North Wall Cofferdam<br>Instruments           |                    | 3 JUL 03  |
|                   | 221             | P-1             | Existing Intake Tower Photograph                                                         |                    | 26 JUN 03 |

STANDARD DETAILS BOUND IN THE SPECIFICATIONS

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SECTION 01501 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

|      |                                         |             |
|------|-----------------------------------------|-------------|
| 1, 2 | Civil Works Project Identification Sign | REV 07APR88 |
| 1    | Hard Hat Sign                           | 10SEP90     |

END OF SECTION

## SECTION 02251

## FOUNDATION DRILLING AND GROUTING

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|                 |                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------|
| ASTM A 53/A 53M | (1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless                         |
| ASTM C 70       | (1994) Surface Moisture in Fine Aggregate                                                           |
| ASTM C 91       | (1998) Masonry Cement                                                                               |
| ASTM C 136      | (1996a) Sieve Analysis of Fine and Coarse Aggregates                                                |
| ASTM C 150      | (1999a) Portland Cement                                                                             |
| ASTM C 618      | (1999) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete |
| ASTM C 937      | (1997) Grout Fluidifier for Preplaced-Aggregate Concrete                                            |

## ASME INTERNATIONAL (ASME)

|            |                                         |
|------------|-----------------------------------------|
| ASME B16.3 | (1992) Malleable Iron Threaded Fittings |
|------------|-----------------------------------------|

## U.S. ARMY CORPS OF ENGINEERS (USACE)

|               |                                                                                                           |
|---------------|-----------------------------------------------------------------------------------------------------------|
| COE CRD-C 100 | (1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing |
| EM 385-1-1    | (1996) Safety and Health Requirements Manual                                                              |

## 1.2 GOVERNMENT SAMPLING AND TESTING

## 1.2.1 Preconstruction Sampling and Testing

## 1.2.1.1 Sand, Cementitious Materials, and Admixtures

Sampling and testing of these materials shall be in accordance with Section 03301a CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

#### 1.2.1.2 Grout Materials

Sampling and testing of grout materials shall be in accordance with Section 03301a CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-03 Product Data

Drilling Equipment  
Grouting Equipment  
Grout Material; G

Details and data on the drilling and grouting equipment shall be submitted for conformance with the requirements of paragraph EQUIPMENT.

Grout Plant; G

A detailed plan shall be submitted showing equipment and grout plant layout proposed for mixing and placing grout.

##### SD-06 Test Reports

Grouting Operations

Contractor shall furnish grouting records to the Government within 24 hours of grouting operations

##### SD-07 Certificates

Contractor Qualifications

Grouting Contractor shall have and provide evidence to the Government of at least 10 years of successful grouting experience on similar projects with adjacent critical structures.

#### 1.4 MATERIALS DELIVERY, STORAGE, AND HANDLING

Transportation and storage of materials shall be in accordance with Section 03301a CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

##### 1.4.1 Cement

A sufficient quantity of cement shall be stored at or near the site of the work to insure that grouting operations will not be delayed by shortage of cement. In the event the cement is found to contain lumps or foreign matter of a nature and in amounts which, in the opinion of the Contracting Officer, may be deleterious to the grouting operations, screening through a standard 100 mesh screen, or rejection of the cement, may be required as determined by the Contracting Officer. No payment will be made for such screening or rejected cement.

## 1.5 PROJECT/SITE CONDITIONS

The project grouting will consist of installation of a grout curtain in four areas of the upstream side of the project site: 1) left abutment; 2) intake structure foundation; 3) intake structure seismic retrofit backfill and 4) cofferdam foundation; the approximate locations, limits and details which are indicated. The intent of the grout curtain is to reduce seepage into the excavation. To maintain adequate overburden pressures and reduce potential for grout leaks, the left abutment and intake structure grouting will be conducted prior to Phase 1B blasting and excavation. The cofferdam foundation grouting will be conducted at an intermediate period of Phase 1B blasting and excavation when the excavation reaches elevation 1075.

The program shown and described is based on currently available information. Conditions encountered during construction may require additions or deletions. The grouting program shall not be modified or curtailed as a construction expediency. It is a required part of design and shall not become secondary to any time or scheduling restrictions. Final determination of grouting mixes, pressures, injection rate and the sequence in which the holes are drilled and grouted will be made in the field and shall be as directed by the Contracting Officer.

## PART 2 PRODUCTS

### 2.1 GROUT MATERIAL

Grout shall be composed of water and cement, pozzolans, admixtures, and fillers, as needed and approved by the Contracting Officer. The grout mixes will be approved by the Contracting Officer and will be varied to meet the characteristics of each hole as determined by conditions encountered. The various materials to be furnished by the Contractor shall conform to the specifications listed in the paragraphs below.

#### 2.1.1 Water

Water suitable for use in the work can be obtained from a well at the left dam abutment just upstream from the spillway gates. It shall be the responsibility of the Contractor to provide a pump and any necessary supply line connections and extensions.

#### 2.1.2 Cement

Cement used in grout shall conform to the requirements of ASTM C 91 and ASTM C 150. The use of bulk cement will not be allowed. Only cement furnished in moisture-resistant cloth or paper bags will be accepted to use in the work. Storage of cement shall be in accordance with paragraph MATERIALS DELIVERY, STORAGE, AND HANDLING.

#### 2.1.3 Pozzolans

Pozzolans, if required, shall be fly ash or other raw or calcined natural pozzolans conforming to ASTM C 618. Sampling will be done by an authorized representative of the Government. All tests will be made by and at the expense of the Government. Pozzolans are to be furnished in moisture resistant paper sacks. It shall be transported, handled, and stored so as to avoid damage, waste, or absorption of moisture. Material which has become caked due to moisture absorption will be rejected.

#### 2.1.4 Microfine Cement

Microfine cement, if required, shall consist of a blend of ultrafine Portland cement and ultrafine blast furnace slag with 95 percent of the particles finer than 10 microns and 50 percent of the particles finer than 3 microns. The ultrafine cement shall include a high range water reducer supplied as a powder preblended into the ultrafine cement or as a liquid to be added by the grouting contractor. Use only liquid superplasticizers supplied by or approved by the ultrafine cement supplier as being compatible with their ultrafine cement. Sampling shall be done by an authorized representative of the Government. All tests shall be made by and at the expense of the Government. Ultrafine cement is to be furnished in moisture resistant sacks. It shall be transported, handled and stored so as to avoid damage, waste, or absorption of moisture. Material that has become caked due to moisture absorption will be rejected.

#### 2.1.5 Admixtures

Admixtures, if required, shall be added to the grout immediately before or during its mixing and will consist of accelerators, retarders, water reducers, aluminum powder, and/or fluidifiers.

#### 2.1.6 Fluidifier

Fluidifier shall be a compound possessing characteristics which will increase the flowability of the mixture, assist in dispersal of the cement grains, and neutralize the setting shrinkage of the grout. The quality of the material shall meet the requirements specified in ASTM C 937. Sampling of fluidifier shall be done by an authorized representative of the Government. Trial mixtures should be tested prior to using the materials in field work. All tests will be made by and at the expense of the Government. Fluidifier shall be furnished in moisture-resistant paper sacks shipped in sealed containers and shall be handled and stored so as to avoid absorption of moisture, damage or waste. Material which has become caked due to moisture absorption will be rejected.

#### 2.1.7 Bentonite

Bentonite shall be sodium (Na) cation, powdered montmorillonite. It shall be added to the cement grout 2 percent to 5 percent by weight of cement. The percentage shall be adjusted as directed by the Contracting Officer. A separate colloidal bentonite mixer is required to mix the bentonite and water to ensure fully dispersing and hydrating the bentonite before adding to the grout mixer. The bentonite shall be handled and stored so as to avoid absorption of moisture, damage, or waste. Bentonite which has become caked due to moisture absorption will be rejected. A sufficient quantity of bentonite shall be stored at or near the site of the work to insure that grouting operations will not be delayed by shortage of bentonite.

#### 2.1.8 Sand

a. Sand for grout shall be clean and consist of hard, tough, durable, uncoated particles with no more than 2 percent passing the #200 sieve. The shape of the particles shall be generally rounded or cubical and shall not contain more than 5 percent of flat or elongated pieces having a maximum dimension in excess of five times the minimum dimension. The sand shall be generally well graded from fine to medium in accordance with ASTM C 136 with 100 percent passing the No. 30 sieve.

b. The sand shall be subjected to such tests as are necessary to

determine its acceptability. All sampling of sand shall be in accordance with the applicable sampling provisions contained in COE CRD-C 100 or as directed. Unless otherwise directed, all test samples shall be taken under the supervision of the Contracting Officer and shall be delivered to a designated point, at the expense of the Contractor, at least 10 working days in advance of the time when sand will be required at the site of work. All tests will be made by the Government at its expense. The tests to which the sand will be subjected will include specific gravity, absorption, soundness in magnesium sulfate, petrographic analyses, and any other tests that are necessary to demonstrate that grout of adequate durability can be produced.

c. The percentage of surface moisture in terms of the saturated surface-dried sand will be determined in accordance with ASTM C 70, or other method giving comparable results.

d. Sand shall be stored in such a manner as to avoid the inclusion of any foreign materials in the grout. All sand shall remain in free draining storage for at least 72 hours prior to use.

## 2.2 METAL PIPE AND FITTINGS

Metal pipe and fittings, if required, for constructing grout and exploratory holes, shall be furnished, cut, threaded, and fabricated by the Contractor.

### 2.2.1 Pipe

Pipe will be black steel. The pipe shall conform to ASTM A 53/A 53M.

### 2.2.2 Fittings

The fittings shall be black, malleable iron in accordance with ASME B16.3.

## PART 3 EXECUTION

### 3.1 EQUIPMENT

#### 3.1.1 General

All drilling, including exploratory hole drilling, and grouting equipment used shall be of a type, capacity and mechanical condition suitable for performing the work, as determined by the Contracting Officer. The power and equipment and the layout thereof shall meet all applicable requirements of local, State, and Federal regulations and codes, both safety and otherwise.

#### 3.1.2 Drilling Equipment

Standard drilling equipment of the rotary or percussion type shall be used to perform the drilling as specified in paragraphs GROUT HOLE DRILLING and EXPLORATORY HOLE DRILLING. Water or air shall be used to remove cuttings from the hole during drilling operations. Supplies shall include all bits, drill rods, tools, casing, piping, pumps, water, and power to accomplish the required drilling. All drilling rigs and pumps will be equipped with pressure gages. A borehole deviation survey, using a method proposed by the Contractor and approved by the Contracting Officer, shall be employed at each stage of the first three primary grout holes in the intake

structure grout curtain. The survey is intended to verify angle and location of grout holes, and reduce potential for damage to the intake structure. If location of grout holes are inaccurate, additional grout holes and deviation surveys may be required, as determined by the Contracting Officer and at no cost to the Government. Water suitable for use in the work will be supplied by the Contractor, as described in paragraph: WATER.

#### 3.1.2.1 Core Boxes

Longitudinal partitioned wooden core boxes shall be furnished for rock cores. Core boxes shall be fabricated from dressed lumber. Core boxes shall be completely equipped with all necessary partitions, covers, hinges and hasps for holding down the cover. White painted wooden spacer blocks used to partition the core to provide marking space to identify core runs shall be furnished with the core boxes. Contractor shall furnish three spacer blocks per core box, painted with non-glass red paint for marking voids and core losses. Staples will not be allowed in core box construction. Core boxes shall be identified with stenciled labels on the inside and outside of the cover. Labels shall show: Project, Boring No. Depth, and Box No. Core boxes shall be placed on wooden pallets. All cores shall be arranged neatly in the partitioned boxes in the same sequence in which they occurred before removal from the boring. Facing the open box with the hinged cover above and the open box below, cores shall be arranged in descending sequence beginning at the left end of the trough nearest the hinges and continuing in the other troughs from left to right. The highest part of the core shall be placed in box no. 1 and the lower portions of the core shall be placed in the other boxes in consecutive order. A waterproof, black, wide-tip felt tip marker shall be used for labeling the core boxes. The individual white blocks shall be placed at the end of a core run and labeled in tenths of feet. White blocks shall contain the following information: Run ID (ie run A); D (length of run, ie 4.8 ft; C (length recovered; ie 4.8 ft); L (loss, ie 0.0); and D (ending depth of run; ie 47.5 ft).

#### 3.1.3 Grouting Equipment

The grout plant shall be capable of supplying, mixing, stirring and pumping the grout and additives, to the satisfaction of the Contracting Officer. The plant shall have a minimum capacity of 30 gpm of grout injected at a combined pressure (static head and pumped pressure) not greater than 150 psi.

The grout plant shall be properly maintained at all times and any grout hole that is lost or damaged due to mechanical failure of equipment or inadequacy of grout supply shall be replaced by another hole, drilled by the Contractor at his expense. The amount of grouting equipment shall be as necessary to perform the work specified herein. The type to be furnished shall include the following:

- a. A progressive cavity pump capable of passing particles up to a top size of No. 16, generating pressures up to 50 psi and pumping a maximum of 30 gpm. In no case will the pump be separated by more than 200 feet of grout line from the header of a hole being grouted.
- b. A colloidal type grout mixer having a minimum drum capacity of approximately 10 to 15 cubic feet with a mix batch of 15 cubic feet. Mixing time shall be as required to mix thoroughly. A No. 30 sieve filter screen shall be placed over the mixer to remove agglomerated grout from the return line.



- c. A separate colloidal mixer for mixing and hydrating bentonite.
- d. A mechanically agitated sump having a minimum capacity of 20 to 30 cubic feet or as required.
- e. A circulating grout header with control valves and a pressure gage with protector. Control valves shall be connected to the return line and header. The header shall be joined directly to the riser pipe at the hole by means of a quick connector union.
- f. A water storage tank or suitable source of clean auxiliary water for use in washing, pressure testing and flushing operations.
- g. A water meter graduated in cubic feet and tenths having a direct reading totalizer and capable of conveniently being set back to zero.
- h. Such valves, packers, pressure gages, pressure hose, supply lines, and small tools as may be necessary to provide a continuous supply of grout at accurately controlled pressures as specified. All valves shall be of the ball type and shall have lever-type handles so that it can be easily determined if the valves are open or closed. The inside diameter of the pressure hose and grout supply line shall be not less than 1 inch. Pressure gages shall be at least 3 inches in diameter and capable of measuring no higher than 50 percent beyond the maximum anticipated grout pressures. An accurately calibrated, high precision pressure gage shall be used to check the accuracy of all gages used in the grouting. Certificates indicating such gage calibration shall be submitted for approval within 10 working days prior to beginning grouting operations. Gages shall be checked at least every 24 hours, or more frequently if the Contracting Officer so determines. When defects are found, grouting operations will be stopped until calibration of gages has been obtained. A sufficient number of additional calibrated gages shall be maintained on site at all times for use as replacements.
- i. A computer system to monitor grouting operations, including grout pressures and rates. Grouting data is to be recorded electronically and displayed in real time. Copies of the grouting data are to be supplied to the Contracting Officer within 24 hours of grout operations.
- j. Equipment to light the work area so that grouting can be conducted during hours of darkness in a safe manner. Lighting must also be directed into the reservoir area adjacent to the work area so that underwater grout leakage can be observed during hours of darkness.

#### 3.1.4 Safety

Cement, lime and bentonite clay are respiratory and skin irritants. Section No. 6 of EM 385-1-1 shall be strictly adhered to and workers shall be equipped with respirators and skin protection during mixing of the dry cement and bentonite products. The manufacturer's recommended safety equipment and instructions shall be used.

#### 3.2 GROUT AND EXPLORATORY HOLES

All holes for grouting or exploration shall be drilled at the locations, in the direction, angle, and to the depths indicated or as directed by the Contracting Officer. A maximum tolerance for deviation in angle and direction shall be one degree. The first series of holes to be drilled

and grouted shall be as shown on the plans and hereinafter are referred to as primary holes. The location of secondary and succeeding series (intermediate) holes shall be determined by the split spacing method as defined in paragraph SPLIT SPACING and as shown on the plans. The number of grout holes shall be increased, progressively, by the split spacing method as deemed necessary by the Contracting Officer until the amount of grout take at each hole is less than 0.1 cubic foot grout over a 10 minute period. Each hole drilled shall be protected from becoming clogged or obstructed by means of a cap or other suitable device on the collar and any hole that becomes clogged or obstructed due to fault of the Contractor before completion of operations shall be cleaned out in a manner satisfactory to the Contracting Officer or another hole provided by and at the expense of the Contractor.

### 3.2.1 Pipe for Foundation Grouting

All metal pipe and fittings required for constructing grout and exploratory holes shall be embedded. The pipe and fittings shall be cleaned thoroughly of all dirt, grease, oil, grout and mortar immediately before embedment. All joints shall be made up snug and the assembly held firmly in position and protected from damage or displacement while the concrete is being placed. The Contractor shall take all necessary precautions to prevent any pipe from becoming clogged or obstructed from any cause and any pipe which becomes clogged shall be cleaned out in a manner satisfactory to the Contracting Officer at the Contractor's expense. The presence of tramp metal such as nails, wire, bolts, nuts and other foreign material in the pipes through which diamond drilled holes are to be drilled shall be considered as obstructions. The Contractor may, if he so elects, substitute percussion or diamond drilled holes through the concrete in lieu of pipe, provided that the method proposed meets with the approval of the Contracting Officer and provided further that such substitution does not result in any increased cost to the Government.

### 3.2.2 Grout Hole Drilling

a. Grout holes shall be drilled with standard rotary or percussion drilling equipment. No core recovery will be required and the type bit used shall be optional with the Contractor. The hole shall be of sufficient diameter to allow use of an expansion plug or packer with an effective inside diameter of not less than 1/2 inch. The minimum diameter of hole shall be 2 inches at the point of maximum penetration.

Drill casing may be needed where grout holes extend through soil. No grout hole will be drilled at an angle less than 60 degrees measured from the horizontal nor to a depth greater than 200 feet measured along the hole from the collar of the hole. If, as the work progresses, it is determined that holes to depths greater than indicated are necessary, drilling to such greater depth will be ordered in writing, and the drilling to depths in excess of 200 feet will be paid for at a negotiated unit price.

b. Drilling will be done in accordance with the applicable grouting method hereinafter described. Upon completion of drilling of any grout hole and prior to pressure testing, all drill cuttings and slurry shall be removed by applying water to the bottom of the hole through open end rods and returning the wash water through the hole to the surface until the return water is clear. No separate payment will be made for this washing.

### 3.2.3 Completion of Grouting

All grouting operations shall be completed and in proper working condition prior to the time of impounding water. At that time, all work in the area shall be completed and the area shall be free of all construction debris. Nipples, if required for grout hole drilling, will be removed.

#### 3.2.4 Exploratory Hole Drilling

a. The Contractor shall perform such exploratory drilling as may be required to determine the condition of the rock prior to grouting or the effectiveness of the grouting operations during or after grouting. All exploratory drilling shall be performed with rotary drilling equipment using HQ size coring type bits. Since the maximum recovery of unpredictable soft or friable materials is of prime importance, the Contractor shall make every effort to recover 100 percent of the core by use of the appropriate equipment and drilling procedures.

b. The holes may be required to be drilled to varying depths, with a maximum depth of 200 feet as measured along the hole from the collar of the hole. No exploratory hole will be drilled at an angle less than 50 degrees measured from the horizontal.

c. Special care should be exercised to obtain cores in as good condition as possible. The Contractor shall keep, in a manner satisfactory to the Contracting Officer, an accurate Driller's Log of all exploratory holes drilled. The log shall include a nontechnical description of all materials encountered in the drilling, their location in the holes and the location of special features such as seams, open cracks, soft or broken rock, points where abnormal loss or gain of drill water occurred, and any other items of interest in connection with the purpose for which the exploratory drilling is required.

d. Wooden or other approved core boxes will be furnished by the Contractor, and the Contractor shall place the cores in the boxes in the correct sequence and separated accurately by wooden blocks, according to the measured distances in the hole. No box shall contain cores from more than one hole. The covers shall be fastened securely to the core boxes and the secured boxes shall be delivered in the vicinity of the work as directed.

e. Exploratory holes shall be grouted under pressure, if conditions so indicate, by grouting to full depth in one operation and backfilled in accordance with paragraph BACKFILLING OF HOLES.

### 3.3 DEFINITIONS AND PROCEDURES FOR DRILLING AND GROUTING

#### 3.3.1 General

The drilling and grouting shall be accomplished in single or multiple lines as shown. The drilling and the grouting shall be done using the split spacing, stage grouting method and by the split spacing, stop grouting method as described herein.

##### 3.3.1.1 Zone

A zone is a predetermined partial depth of curtain. Zones are shown on the plans.

### 3.3.1.2 Section

A section is a reach along the grout curtain, not more than 100 feet in length, in which grouting operations will not be permitted at the same time that drilling is in progress. Insofar as practicable, the grout curtain will be subdivided into sections in a manner which will facilitate the Contractor's operations.

### 3.3.1.3 Stage

A stage is one complete operational cycle of drilling, cleaning, pressure washing, pressure testing, and pressure grouting within a zone. The actual depth of a stage depends upon geologic conditions encountered in drilling. It may vary from a fraction to the full depth of the zone.

### 3.3.1.4 Stop

A stop is a predetermined depth at which the expanding plug or packer is positioned.

### 3.3.1.5 Split Spacing

Split spacing is the procedure of locating an additional grout hole midway between two previously drilled and grouted holes.

## 3.3.2 Stage Grouting

Stage grouting is the grouting of progressively deeper zones in stages. It involves the placement of a grout curtain by drilling and grouting in successive operations in accordance with the following general procedure.

### 3.3.2.1 Primary Holes

Primary holes for foundation grouting shall be drilled to their first stage of depth within the first zone. The depths will be governed by the foundation conditions.

a. The holes thus drilled shall be washed and pressure tested, and then grouted, except that when pressure testing indicates a relatively tight hole, the Contracting Officer may direct that the grouting of that hole be omitted for that stage and the hole be left open for drilling and grouting of the next stage.

b. After the grouting of any hole, the grout within the hole shall be allowed to set and subsequently the hole shall be redrilled.

c. After the interval of time as specified in paragraph SECOND STAGE, the primary holes not already drilled to the limit of the first zone shall be drilled as directed to additional depths not exceeding the zone limit.

d. The primary holes thus deepened shall again be washed and pressure tested and then grouted at higher pressures as directed. Again, the grout within the hole shall be removed as described above.

e. The process of successively drilling primary holes to additional depths and grouting at higher and higher pressures in stages, as directed, shall be repeated until all of the primary holes on the maximum spacing (see paragraph GROUT AND EXPLORATORY HOLES) have been

completely drilled and grouted to the depth of the first zone in that section of the grout curtain.

#### 3.3.2.2 Successive Holes

After the primary holes in the first zone have been completed in any section as specified above, the second and succeeding series of holes, as determined by the "split spacing method," shall be drilled and grouted to the depth of the first zone in like manner until the first zone of that section is completely grouted as directed.

#### 3.3.2.3 Completion of Section

The process of successively drilling to additional depths and grouting at higher and higher pressures in stages for the first series of holes and then for succeeding series of holes shall be repeated for the second and subsequent zones of that section. Other sections along the grout curtain shall be grouted in like manner until grouting of the foundation is completed to the satisfaction of the Contracting Officer. As the drilling and grouting work progresses, it may develop that conditions are such that all or parts of the foundation already grouted require additional grouting.

In such event, the equipment shall be returned and additional holes shall be drilled and grouted as directed.

#### 3.3.3 Stop Grouting

Stop grouting is a method whereby each hole is drilled to a final depth and grouted by stops through an expansion plug or packer which is set at successively shallower depths. It involves the placement of a grout curtain by drilling and grouting in accordance with the following general procedure:

- a. Drill hole to the full depth and wash as specified in paragraph GROUT HOLE DRILLING.
- b. The holes thus drilled and washed shall be pressure washed and tested as specified in paragraph PRESSURE WASHING AND PRESSURE TESTING.
- c. The expansion plug, or packer, shall be placed in the hole at the top of the interval to be grouted blocking off the higher portion of the hole, and the interval is grouted. The lowest zone is grouted first. In no case will the Contractor be required to set the packer deeper than 175 feet, as measured along the hole from the collar of the hole.
- d. After placing the grout at the pressure and mix directed by the Contracting Officer, the expansion plug, or packer, shall be left in place until the grout pressure drops to that pressure required for the next higher stop or as directed by the Contracting Officer.
- e. The expansion plug, or packer, shall then be moved to the next higher stop and grout placed at the lower pressure as directed by the Contracting Officer.
- f. The procedures described in subparagraphs "d" and "e" above shall be repeated until grouting of the hole is complete.
- g. After the primary holes in the first zone have been completed in any section as specified above, the second and succeeding series of

holes, as determined by the "split spacing method" shall be drilled and grouted in like manner until all zones of that section are completely grouted as directed.

h. Other sections along the grout curtain shall be grouted in like manner until grouting of the foundation is completed to the satisfaction of the Contracting Officer.

i. As the drilling and grouting work progresses, it may develop that conditions are such that all or parts of the foundation already grouted require additional grouting. In such event, the equipment shall be returned and additional holes for grouting shall be drilled and grouted as directed. No allowance above contract unit prices will be made for drilling and grouting such holes. Expense for movement of equipment necessary to the performance of such work shall be compensated for at agreed upon rates.

#### 3.3.4 Pressure Washing and Pressure Testing

Immediately before the pressure grouting operation, the hole shall be thoroughly washed under pressure and pressure tested. All intersected rock seams and crevices containing clay or other washable materials shall be washed with water and air under pressure to remove as much of these materials as possible. If practicable, as determined by the Contracting Officer, such material shall be ejected from one or more holes by introducing water and air under pressure into an adjacent hole. In no case shall such pressure exceed the maximum grouting pressure, as directed by the Contracting Officer. All grout holes shall be tested with clean water under continuous pressure up to the maximum grouting pressure and held for 15 minutes as directed with readings recorded of the water meter flow rate at 5, 10 and 15 minutes. All holes sufficiently tight to build up the maximum required pressure shall be washed at such pressure and the washing shall continue as long as there is any increase in the rate at which water is taken, such increase indicating the fractures are being opened by the washing operation. Grout holes with water takes of less than 3 Lugeon units shall be considered tight and will not require grouting. Lugeon unit = (cubic feet per foot per minute/0.01076)\*(142 psi/actual test pressure in psi). Open holes in which no pressure can be built up shall be washed for a period of 5 minutes, with the pump operating at full capacity, or for such period of time as fracture-filling is being removed, as evidenced by the escape of muddy water through surface openings or other grout holes.

#### 3.3.5 Stage Grouting Procedures

##### 3.3.5.1 First Stage

The Contractor shall perform the first stage of curtain grouting by washing and grouting holes at locations indicated or as directed, using the "split spacing" method described in paragraph SPLIT SPACING. Similar stages of drilling and grouting are repeated as necessary to reach the bottom of the first zone. Before grouting is begun in any hole of a given series in any section, at least the nearest two holes in advance of each such hole in that series shall be completely drilled for the same stage and the adjacent hole completely washed to facilitate washing and flushing out of any intervening clay-filled seams, fractures, or solution channels.

##### 3.3.5.2 Second Stage

After all primary holes in the first stage grouting in any section has been

completed, as specified above, the Contractor shall proceed, when so directed, with second stage drilling and grouting in accordance with the procedure outlined herein but in no case shall the deepening of any hole preparatory to grouting be commenced before the previously placed grout has set. Second stage grouting shall not be conducted within a distance of approximately 100 feet of any hole in which a previous stage of grouting has been completed until the grout in such previous stage hole has taken its set. Grouting at subsequent stages shall conform to the same requirements as to minimum time and distance. Upon completion of all primary holes to the bottom of the first zone, and after the waiting period, secondary and tertiary holes are drilled and grouted in the first zone. The process of drilling, washing, pressure washing, pressure testing, and grouting at progressively higher pressures is continued until the ground is satisfactorily tight to the required depth.

### 3.3.6 Stop Grouting Procedures

#### 3.3.6.1 Stop Grouting of Grout Holes

The Contractor shall perform the grouting by washing and grouting holes at locations indicated or as directed. Before grouting is begun in any hole of a given series in any section, at least the nearest two holes in the advance of each such hole in that series shall be completely drilled and the adjacent hole completely washed to facilitate washing and flushing out of any intervening clay-filled seams, fractures, or solution channels.

#### 3.3.6.2 Grouting of Existing Exploratory Holes

Existing exploratory holes or portions of holes more than five feet deep after excavation shall be cleaned and pressure grouted as specified for grout holes. Holes less than 5 feet deep shall be back-filled with grout mixed in proportions directed by the Contracting Officer. Gravity grouting or backfilling shall be done in accordance with paragraph BACKFILLING OF HOLES.

### 3.3.7 Grouting Pressures

Grouting pressures to be used in the work will vary with conditions encountered in the respective holes and pressures used shall be as directed. It is anticipated that pressures, as measured at a gauge at the surface, will range from 0 psi to 30 psi but in no event will gauge pressures in excess of 50 psi be required or allowed.

### 3.3.8 Grouting

All pressure grouting operations shall be performed in the presence of the Contracting Officer, and shall be in accordance with the following general procedures.

#### 3.3.8.1 Grout Mixes

Mixes shall be in the proportions approved by the Contracting Officer who will, from time to time, direct changes to suit the conditions found to exist in the particular grout hole. The cement grout will include 2 percent to 5 percent (by weight of cement) of sodium bentonite. The water/cement ratio by volume will be varied to meet the characteristics of each hole as revealed by the grouting operation and will range between 4:1 and 0.8:1. The Contractor shall conduct periodic tests on the grout mix using funnel and mud balance tests to insure consistency of grout mixes.

The types of grout shall be as follows:

- a. Cement Grout shall consist of cement, bentonite and water.
- b. Mortar Grout shall consist of cement, bentonite, sand, and water.

#### 3.3.8.2 Grout Injection

a. In general, if pressure tests indicate a tight hole, grouting shall be started with a thin mix or may not be required. If an open hole condition exists, as determined by loss of drill water or inability to build up pressure during washing operations, then grouting shall be started with a thicker mix and with a grout pump operating as nearly as practicable at constant speed at all times; the water/cement ratio will be decreased, if necessary, until the required pressure has been reached. If this procedure does not produce the desired pressure, mortar grout can be used and the mix varied as necessary to produce the desired results, as directed by the Contracting Officer.

b. When the pressure tends to rise too high, the water/cement ratio shall be increased and/or the mix of mortar grout changed or discontinued as may be required to produce the desired results. If necessary to relieve premature stoppage, periodic applications of water under pressure shall be made. Under no conditions shall the pressure or rate of pumping be increased suddenly as either may produce a water-hammer effect which may promote stoppage.

c. The grouting of any hole shall not be considered complete until that hole takes grout at the rate of one cubic foot of grout or less in ten minutes measured over at least a five minute period at the pressure required for that portion of the hole being grouted.

d. Should grout leaks develop on the ground surface from the formation, the Contractor shall caulk such leaks when and as directed, the cost thereof being included in the contract price for unit price pay item "Placing Grout", in accordance with Section 01025 MEASUREMENT AND PAYMENT. If grout leaks develop underwater from the formation, the mix will be thickened in an attempt to stop the leak and/or grouting will be terminated, as directed by the Contracting Officer.

e. If, due to size and continuity of fracture, it is found impossible to reach the required pressure after pumping a reasonable volume of grout at the minimum workable water/cement ratio or mortar grout with the maximum volume of sand at the minimum workable water/cement ratio, the speed of the pumping shall be reduced or pumping shall be stopped temporarily and intermittent grouting shall be performed, allowing sufficient time between grout injections for the grout to stiffen. Following such reduction in pumping speed, if the desired result is not obtained, grouting in the hole shall be discontinued when directed. In such event, the hole shall be cleaned, the grout allowed to set, and additional drilling and grouting shall then be done in this hole or in the adjacent areas as directed, until the desired resistance is built up.

f. After the grouting of any stage or stop of a hole is finished, the pressure shall be maintained by means of a stop-cock or other suitable device until the grout has set to the extent that it will be retained in the hole.



g. Grout that cannot be placed, for any reason, within two hours after mixing shall be wasted. If such grout is mixed at the direction of the Contracting Officer or with his knowledge and consent, such wasted grout, except as specified in Section 01025 MEASUREMENT AND PAYMENT, shall be paid for at the contract unit prices for the materials contained therein.

#### 3.3.8.3 Backfilling of Holes

Where directed by the Contracting Officer, holes shall be backfilled with grout proportioned as directed by the Contracting Officer and generally having a water/cement ratio less than 1.0. The backfilling shall be accomplished by injection of grout through a tremie pipe or hose inserted to full depth of hole. When grout vents at the surface, the tremie shall be gradually withdrawn, maintaining grout in pipe or hose until completely removed. Holes containing freshly injected grout shall not be backfilled until the injected grout has set. No separate payment will be made for backfilling holes; however, grout will be paid for at the contract unit price for the Portland cement therein.

#### 3.3.8.4 Equipment Arrangement and Operation

The arrangement of the grouting equipment shall be such as to provide a continuous circulation of grout throughout the system and to permit accurate pressure control by operation of a valve on the grout return line, regardless of how small the grout take may be. The equipment and lines shall be prevented from becoming fouled by the constant circulation of grout and by the periodic flushing out of the system with water. Flushing shall be done with the grout intake valve closed, the water supply valve open, and the pump running at full speed.

#### 3.3.8.5 Protection to Work and Cleanup

During grouting operations the Contractor shall take such precautions as may be necessary to prevent drill cuttings, equipment exhaust oil, wash water, and grout, from defacing or damaging the permanent structure. Daily maintenance may be required along grout lines, in order to offer better inspection of interconnected holes and breakouts. The Contractor will be required to furnish such pumps as may be necessary to care for waste water and grout from his operations. The Contractor shall, upon completion of his operations, clean up all waste resulting from his operations that is unsightly or would interfere with the efficient operation of the project as anticipated by the original design.

#### 3.3.9 Records

The Contractor will keep records of all grouting operations, such as a log of the grout holes, results of washing and pressure testing operations, time of each change of grouting operation, pressure, rate of pumping, amount of cement for each change in water/cement ratio, and other data as deemed by him to be necessary. The Contractor shall furnish these records to the Contracting Officer within 24 hours of grouting operations.

#### 3.3.10 Communications

When, for his own convenience, the Contractor has the individual elements of his plant so located that communication by normal voice between these elements is not satisfactory, the Contracting Officer may require him to install a satisfactory mechanical means of communications, such as a

telephone or other suitable device.

-- End of Section --